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ARAC and its Modernization

by

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The Atmospheric Release Advisory Capability (ARAC), located at Lawrence Livermore National Laboratory, since its inception 20 years ago has projected downwind consequences resulting from more than 70 hazardous release events that included Three-mile Island and the Chernobyl nuclear power plant accidents. During that period, ARAC had integrated significant automation and a worldwide capability.

ARAC Program center and staff just recently moved into a newly completed building called the National Atmospheric Release Advisory Center (NARAC). This facility was built for ARAC by US Department of Energy Defense Programs through the Office of Emergency Response. This new facility is designed appropriately for housing a modernized ARAC.

The multi-year modernization effort begun over two years ago is now well underway with full completion expected before the year 2000. The modernization involves a new computer system, improved three-dimensional diagnostic flow and atmospheric dispersion models, and a completely new mesoscale prognostic atmospheric modeling capability. A UNIX-based distributed computing architecture will be the underlying framework for the 3-D visualization tools, interactive graphical user interface applications, communications software, file management, database management, and modeling environment. Terrain representation in the atmospheric transport flow and dispersion models will be continuous rather than the block-terrain representation in the earlier models. This representation will not only give more realism to the models, but will eliminate the numerical problems associated with transport in artificially stepped terrain, and will be compatible with the continuous terrain representation in the prognostic atmospheric models. As part of the modernization effort, we are adapting and integrating the US. Navy Operational Regional Atmospheric Prediction System (NORAPS) prognostic model into ARAC's operations architecture. Our objective for the NORAPS model is to be able to rapidly generate detailed regional atmospheric flow in space and time anywhere worldwide for emergency response assessments.

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